

## Background

- West Nile virus (WNV) is a mosquito-borne virus that infects birds, animals and humans
- First emerged in the United States in New York City in 1999
- Since then, WNV has spread rapidly from the eastern to western United States

## Routes of transmission to humans

- Primarily through bites by infected mosquitoes
- Rarely, via blood transfusion, organ transplant, transplacental, breastfeeding, and occupational percutaneous injuries

## Clinical features

- Incubation period ranges from 2 to 14 days (average is 2-6 days)
- Approximately 80% infected are asymptomatic
- Approximately 20% have mild-moderate symptoms: **WNV non-neuroinvasive disease**
  - Fever, headache, myalgias, malaise, gastrointestinal symptoms
  - Maculopapular rash and lymphadenopathy can occur
  - Symptoms may last for weeks
  - Does not progress to more serious disease
- Less than 1% have severe infection: **WNV neuroinvasive disease**
  - Incidence and case fatality rate increase with age, greatest risk is age >50 years
  - Meningitis and encephalitis are most common presentation
  - Myelitis with acute flaccid paralysis, neuropathies, neuritis, and other neurologic manifestations are rare

## Laboratory features

- Leukocyte count is usually normal or elevated, but lymphocytopenia and anemia can occur
- Cerebrospinal fluid (CSF) may show pleocytosis, usually with lymphocyte predominance; protein is usually elevated and glucose normal
- Hyponatremia may be present, particularly with encephalitis
- Computed tomographic (CT) scans of the brain are normal, but magnetic resonance imaging (MRI) may show enhancement of the leptomeninges, and/or periventricular areas

## Diagnostic testing

- Antibody capture enzyme immunoassay (EIA) method is the optimal diagnostic test in immunocompetent patients (in areas with low rates of WNV, EIA may require confirmation with another assay: plaque-reduction neutralization test [PRNT]), performed at the Centers for Disease Control and Prevention
  - Serum WNV IgM antibodies are detectable by antibody capture enzyme immunoassay (EIA) 8-14 days after onset; IgM may persist for 12-18 months
  - CSF WNV IgM antibodies may be detected earlier than serum IgM, using antibody capture EIA
  - EIA assays are available from commercial reference laboratories

- ☐ For patients with suspected neuroinvasive disease, EIA assay is available at Washington State Department of Health Public Health Laboratories (see **Guidelines for Diagnostic Testing at the Public Health Laboratories**)
- Isolation of WNV from serum, tissue; very rarely isolated from CSF
  - ☐ Viral culture performed only by biosafety level 3 laboratories
- WNV nucleic acid detected by nucleic acid amplification assays (e.g., polymerase chain reaction [PCR], etc.)
  - ☐ Sensitivity of PCR in patients at onset of neuroinvasive disease: 14% from serum, 57% from CSF; detection of viral nucleic acid by PCR may be prolonged in immunocompromised patients, and PCR may be the test of choice in this population
  - ☐ Tests performed at limited commercial laboratories

### Clinical management

- Treatment of non-neuroinvasive disease is supportive
- Most patients with neuroinvasive disease will require hospitalization for intensive supportive care, as the most frequent causes of death are respiratory failure and cerebral edema
- No WNV-specific therapy is currently available
  - ☐ Ribavirin and interferon  $\alpha$  have shown in vitro activity
  - ☐ WNV-specific immunoglobulin (WNV-IG) was successful in an anecdotal report
  - ☐ Clinical trials of interferon  $\alpha$  and WNV-IG are ongoing
- Vaccines in development

### Reporting suspected cases to public health

Suspected and confirmed West Nile virus infection are notifiable conditions in Washington (WAC 246-100, 246-101). All suspected or confirmed cases of WNV disease should be reported to your local health department (for contact information, see: [www.doh.wa.gov/LHJMap/LHJMap.htm](http://www.doh.wa.gov/LHJMap/LHJMap.htm)) or to Washington State Department of Health Communicable Disease Epidemiology Section at 206.361.2914 or toll free 877.539.4344; Web site: [www.doh.wa.gov/Notify/nc/wnv\\_hm](http://www.doh.wa.gov/Notify/nc/wnv_hm).